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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,064	04/19/2004	Cyril Cabral, JR.	YOR919990509US3 (13171AB)	2363
23389	7590	05/19/2005	EXAMINER	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			KIELIN, ERIK J	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/827,064

Applicant(s)

CABRAL, ET AL

Examiner

Erik Kielin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24,25 and 28-32 is/are pending in the application.
- 4a) Of the above claim(s) none is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24,25 and 28-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This action responds to the Amendment filed 14 March 2005.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 24, 25, and 28-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 24, as amended, recites the limitation, "...said first layer of Ni monosilicide comprises 0.01 to 50 atomic percent of at least one alloy additive selected from the group consisting of C, Al, Si, ..." Applicant indicates, in the Response filed 14 March 2005, that support for this limitation can be found in the instant specification at page 9, lines 7-22 (Response, p. 4, last line). By contrast, page 9, lines 7-22 of the specification states,

"The **metal germanium alloy** layer of the present invention may also include at least one additive, said at least one additive being selected from the group consisting of C, Al, Si, ... When an additive is present, the at least one additive is present in an amount of from about 0.01 to about 50 atomic (at.) %, with a range of from about 0.1 to about 20 at. & being more preferred. Mixtures of one or more of these additives are also contemplated herein." (Emphasis added.)

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Accordingly, there is no teach of the quantity of additive in the final Ni monosilicide layer. The specification indicates that the metal germanium alloy is annealed and that there exists, not only reaction of the metal with silicon from the silicon-containing substrate to form a silicide, but also that the Ge selective diffuses to form a Si-Ge interface between the silicide and the substrate (instant specification, paragraph bridging pages 11-12). The specification further in this paragraph that the amount of germanium remaining the metal germanium alloy is variable. Furthermore, unreacted metal-germanium alloy is removed (p. 12, last paragraph), so it is additionally unclear how much of the metal additive actually arrives in the silicide. Because it is unknown (1) how much metal and germanium is initially present in the metal germanium alloy, (2) how much germanium diffuses out, (3) how much additive remains in the final Ni monosilicide, the presently claimed concentration of "0.01 to about 50 atomic (at.) %" or any other amount in the Ni monosilicide layer cannot be known based upon the amount in the initial metal germanium alloy used to make the Ni monosilicide. For all these reasons, this amounts to the claiming of new matter, unsupported by the instant disclosure.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 24, 25, and 28-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,810,924 (**Legoues** et al.), assigned to the same assignee as the instant application, in view of US 6,165,903 (**Besser** et al.).

Regarding claim 24, **Legoues** discloses an electrical contact to a region of a silicon-containing substrate comprising,

a substrate having an exposed region of a silicon-containing semiconductor material (paragraph bridging cols. 5-6); and

a first layer of Ni silicide, wherein said substrate and said first layer are separated by a Si-Ge interlayer 12 (col. 6, lines 6-24; paragraph bridging cols. 14-15).

Legoues does not indicate that the nickel silicide is nickel monosilicide (NiSi).

Besser teaches that it is known in the art that NiSi, by contrast to the disilicides of Ti and Co (TiSi₂ and CoSi₂), is the low resistivity phase of nickel (col. 1, lines 22-30).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use nickel monosilicide as the nickel silicide in **Legoues** because it is the low resistivity phase of the nickel silicide, as taught to be notoriously well known in the art by **Besser**.

Note that nickel monosilicide (NiSi) necessarily contains 50 atom % silicon based upon the molecular formula, NiSi; therefore, the additive of silicon is present in an amount of 50 atom % --as further limited by instant claims 31 and 32.

Regarding claim 25, **Legoues** discloses the electrical contact of Claim 24 wherein said silicon-containing semiconductor material comprises, *inter alia*, single crystal Si and SiGe (paragraph bridging cols. 5-6).

Regarding claims 28-30, **Legoues** discloses a p-i-n diode **25**, therefore the substrate necessarily includes a doped p+ and n+ regions. While the nomenclature “+” is not used, the “+” is a relative term of degree and does not have patentable weight absent a specifically claimed amount.

5. Claims 24, 25, and 28-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,698,869 (**Yoshimi et al.**) in view of **Besser**.

Regarding claim 24, **Yoshimi** discloses an electrical contact to a region of a silicon-containing substrate comprising,

a substrate **201** having an exposed region of a silicon-containing semiconductor material (Fig. 14); and

a first layer of Ni silicide **74**, wherein said substrate and said first layer are separated by a Si-Ge interlayer **47** (Fig. 14, paragraph bridging cols. 19-20, col. 20, lines 50-60, and col. 21, lines 50-54).

Yoshimi does not indicate that the nickel silicide is nickel monosilicide (NiSi).

Besser teaches that it is known in the art that NiSi, by contrast to the disilicides of Ti and Co (TiSi₂ and CoSi₂), is the low resistivity phase of nickel (col. 1, lines 22-30).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use nickel monosilicide as the nickel silicide in **Yoshimi** because it is the low resistivity phase of the nickel silicide, as taught to be notoriously well known in the art by **Besser**.

Note that nickel monosilicide (NiSi) necessarily contains 50 atom % silicon based upon the molecular formula, NiSi; therefore, the additive of silicon is present in an amount of 50 atom % --as further limited by instant claims 31 and 32.

Regarding claim 25, **Yoshimi** discloses the electrical contact of Claim 24 wherein said silicon-containing semiconductor material comprises, *inter alia*, silicon-on-insulator (SOI) (col. 19, lines 50-54).

Regarding claims 28-30, **Yoshimi** discloses the electrical contact of Claim 24 wherein said substrate **201** is p-type doped (Fig. 14; col. 19, lines 50-54) and therefore includes p+ doped regions. The substrate also includes n+ regions **206** (Fig. 4A). While the nomenclature "p+" is not used, the "+" is a relative term of degree and does not have patentable weight absent a specifically claimed amount.

Response to Arguments

6. Applicant's arguments filed 14 March 2005 have been fully considered but they are not persuasive.

Applicant's arguments rely on a feature that is not enabled by the instant specification, as being drawn to new matter, specifically the quantity of additive, and are therefore not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Accordingly, that Legoues and Yoshima do not indicate that the nickel silicide is nickel monosilicide, is a deficiency alleviated

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by Besser as applied to each of Legoues and Yoshima. Any argument should properly address the combination or references, according to precedent.

Applicant also argues that Besser does not teach one of the claimed additives and therefore does not make up this alleged deficiency in each of Legoues and Yoshima. Each of Yoshima, Legoues and Besser teaches the additive of Si, as NiSi. Accordingly, Applicant is factually in error.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 571-272-1693. The examiner can normally be reached from 9:00 - 19:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Erik Kielin
Primary Examiner
May 16, 2005